NASA
Glenn
Success
Stories

MISSE PEACE Experiments

Hathaway Brown School

TECHNOLOGY

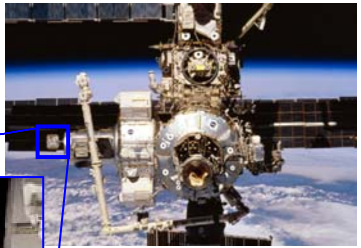
In 2001 the Materials International Space Station Experiment 2 (MISSE 2) launched with the PEACE (Polymer Erosion and Contamination Experiment) experiment and was exposed to space for 4 years on the exterior of the International Space Station. PEACE is a collaboration between NASA Glenn Research Center (GRC) and Hathaway Brown School. PEACE experiments have also flown on MISSE 5 (13 months) and will be flown on MISSE 6. The purpose of the space experiments is to determine the atomic oxygen erosion yield, Ey (volume loss per incident oxygen atom) of a wide variety of polymers exposed for an extended period of time to the low Earth orbit space environment.

COMMERCIAL APPLICATION

The MISSE PEACE experiments will enable the development of an atomic oxygen erosion yield predictive tool leading to the production of new materials that can be used for space exploration. The flight data will also open the door to many different commercial sectors such as textured biomedical surfaces for cell culturing and glucose monitoring.

SOCIAL / ECONOMIC BENEFIT

- The results of the experiments will give insight into which polymers can withstand the extreme space environment with the lowest Ey. Therefore, lowering the cost of replacing inferior materials in space.
- The young women who participate in this project have the unique experience of graduating high school with publications and presentation experience as well as award scholarships for their work with PEACE.
- Both NASA GRC and Hathaway Brown School have received positive media attention for this in a variety of different venues.



International Space Station

MISSE 2

MISSE 2 PEACE Polymers Experiment (post-flight)

Kim de Groh, Lauren Berger, Rochelle Rucker & Bruce Banks opening the flight experiment

NASA APPLICATIONS

The MISSE PEACE experiments offer valuable information to NASA on the durability of both commonly used and new polymers for use in the space environment. Having atomic oxygen erosion yield data for many different polymers, all characterized and exposed to space under identical conditions, and having space data to develop or improve predictive models will enable proper selection of materials and thickness for future long-duration space missions.

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